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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toshio Tahira

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EXAMINER

HORNING, JOEL G

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/529,076	Applicant(s) TAHIRA ET AL.	
	Examiner JOEL G. HORNING	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 12-40 and 51-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 41-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/20/08;04/30/08;04/01/08;02/26/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 12-40 and 51-58 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected inventions, there being no allowable generic or linking claim.

Applicant's election with traverse of the restriction requirement in the reply filed on 07-25-08 is acknowledged. The traversal is on the ground(s) that the new amendments to the claims add additional technical features that are common to all claims which were not considered. This is not found persuasive because of the restriction requirement that has been changed to incorporate these new features.

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group A, claim(s) 1-11 and 41-50, drawn to a method of forming an active matrix organic EL display element by depositing an organic EL material via an electrostatic attraction type inkjet and the display element thus produced.

Group B, claim(s) 12, 13, 39 and 40 drawn to an apparatus of an electrostatic attraction type inkjet.

Group C, claim(s) 14, 15, 16-26, 51 and 52, drawn to a method of forming a liquid crystal array by ejecting droplets of a spacer material less than 1 μ m in size by an inkjet method and the liquid crystal array thus produced.

Group D, claim(s) 27-31 and 53, drawn to a method of forming a liquid crystal array by hitting a spacer material that has previously been deposited with a droplet from an

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electrostatic attraction-type inkjet device, so the spacer moves and the liquid crystal array thus produced.

Group E, claim(s) 32-38 and 54-58, drawn to a method of ejecting drops of color filter layer liquid by an inkjet method and the color filter layer thus produced.

The inventions listed as Groups A-E do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The technical feature all of the groups have in common is an electrostatic attraction type inkjet device whose injection hole is smaller than the diameter of the droplets and is capable of producing droplets of 1pl or less in amount. However, Higashino et al teaches an electrostatic attraction type inkjet device (abstract) that is always shown to have a nozzle size smaller than the droplet size (figures 11 and 14), which would presumably be capable of forming droplets of 1pl or smaller in size by controlling the voltage and area of the electrodes (col 1, line 59 through col 2, line 5). Thus, the common technical feature is not a special technical feature.

Claim Objections

3. Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6 was modified to incorporate all the limitations of dependent claim 7, but claim 7 was not cancelled.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 11 and 42-50** are rejected under 35 U.S.C. 102(b) as being anticipated by Shimoda et al (JP-10-012377, english abstract as supplied by applicant).

The instant claims are product by process claims directed towards active matrix organic EL display elements deposited by an inkjet process. Wherein the inkjet device is an electrostatic attraction inkjet device, the nozzle hole in the inkjet is smaller than the droplet diameter, and the ink drops have a volume of 1pL or less. According to MPEP 2113: "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process."

Shimoda et al teaches making active matrix organic EL display elements using an inkjet process (**claims 11**), with an organic light emitting layer (**claims 44 and 49**) and charge transport layer (**claims 45, 50**) (abstract). How the inkjet device ejects the ink, whether the nozzle is smaller than the drop size, the volume of the drops, the volumetric concentration of the drops (**claims 42, 46 and 47**) and the viscosity of the ejected drops being 20cP or greater (**claims 43 and 48**) would not necessarily produce any structural change in the produced device, thus the active matrix organic EL display elements produced using the Shimoda et al method would be indistinguishable from those claimed and thus meets the above claim limitations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1-11 and 41-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda et al (JP10-012377, English abstract as supplied by applicant) in view of Higashino et al (US 6322198) in view of Chang et al (US 2002/0118251) in view of Hawkins et al (US 2002/0130931).

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The instant claims are directed towards a method of producing an active matrix organic EL display element by using an inkjet method to form an organic EL layer from droplets of an organic EL layer material, wherein the inkjet device:

- a. is an electrostatic attraction type inkjet
- b. has an ejection hole diameter less than that of the liquid droplets
- c. produces droplets having a volume of 1 picoliter or less.

Shimoda et al teaches a method of forming an active matrix organic EL display by using an inkjet device in order to deposit layers of organic light emitting materials (abstract), which, as illustrated in figure 1(c), means that liquid drops of the organic EL material are deposited on the surface.

Shimoda et al does not specify what kind of inkjet method is used, so it does not appear to teach using an electrostatic type inkjet device.

However, Higashino et al is directed towards depositing films by inkjet methods and teaches using an inkjet device where electrostatic attraction between two electrodes causes the ink to eject (abstract). Higashino et al further teaches that this electrostatic attraction method of controlling jetting allows the volume of the ink droplet to be varied by controlling the potential over those electrodes (col 1, lines 59-64). Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use an electrostatic attraction type inkjet device in order to deposit the organic EL material layers of Shimoda et al since it was a known inkjet method, which would be suitable for depositing the inks and also because it would

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provide the additional advantage of being able to tune the volume of the droplets by controlling the potential over the electrodes.

Shimoda et al does not teach what the volume of the droplets or the size of the nozzle should be.

However, Chang et al teaches that reducing the volume of the drops ejected by inkjet devices allows for increased resolution of the produced image. To this end, they teach that inkjet devices with drop sizes less than 1pl are commercially available in order to produce high resolution images [0003].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use drop sizes that are as small as possible, such as of 1pl or less with the process of Shimoda et al in order to increase the resolution of the produced pattern, which would allow for better quality patterning and the production of higher resolution displays to be made using the Shimoda et al method.

Shimoda et al also does not teach what the size of the ink injection nozzle is.

However, Hawkins et al teaches that in inkjet devices, the diameter of the nozzle is a result effective variable for determining the flow of ink through the nozzle and thus the droplet size [0094].

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed nozzle with a “diameter smaller than a diameter of the droplets” through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the

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optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (**claims 1 and 7**).

6. Regarding **claim 2**, a person of ordinary skill in the art will always choose to make the deposited organic EL film the thickness that is desired. The thickness of the organic EL film is the volume of organic EL material that composes the film divided by the surface area over which the film is deposited. Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to calculate the volumetric concentration of organic EL material in the liquid such that the volume of organic EL material deposited by each drop on the surface adds up to the desired thickness. Such a person would do so because to do otherwise would be undesirable.
7. Regarding **claim 6**, the amount of solute present in a given volume of solvent (e.g. the volumetric concentration of that EL material in the fluid) is the amount of solute deposited when the solvent is removed. Thus, increasing the volumetric concentration of EL material will make the deposited layer thicker and the volumetric concentration of the EL material in the fluid is a result effective variable for determining the thickness of the resulting film.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of volumetric concentration substantially equal to $(\beta \times t)/(\alpha \times D)$ through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable

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ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

8. Regarding **claims 3 and 8**, Shimoda et al does not teach what the viscosity of the liquid is. However, Hawkins et al teaches that the fluid viscosity is a result effective variable for determining the size of the produced droplet [0094].

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of a “viscosity of 20cP or greater” through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

9. Regarding **claims 4 and 9**, Shimoda et al teach that layers of organic light emitting material are part of the organic EL layer that is deposited (abstract).
10. Regarding **claims 5, 10 and 41**, Shimoda et al further teaches applying a charge transport layer (positive hole injection layer) as part of the organic EL layer (abstract).
11. **Claims 11 and 42-50** are alternately rejected as obvious end products resulting from obvious modifications to the process of Shimoda et al.

Double Patenting

12. **Claim 10** is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 5.

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13. **Claim 50** is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 45.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Conclusion

14. No current claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792